



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

DIOPHANTINE ANALYSIS.

85. Proposed by A. H. BELL, Hillsboro, Ill.

Given $x^2 - 85\frac{1}{4}y^2 = 5$. What is the value of x and y in whole numbers?

Solution by G. B. M. ZERR, A. M., Ph. D., Professor of Chemistry and Physics, The Temple College, Philadelphia, Pa.

$$x^2 - 85\frac{1}{4}y^2 = 5, \quad 4x^2 - 341y^2 = 20, \quad x^2 = 5 + \frac{341}{4}y^2.$$

$$\text{Let } y = 2z. \quad \therefore x^2 = 5 + 341z^2.$$

Let $z = 2$. Then $x = 37$, $y = 4$ are the least integral values.

86. Proposed by B. F. FINKEL, A.M., M.Sc., Professor of Mathematics and Physics, Drury College, Springfield, Mo.

Prove that $x^2 + 1457 \equiv 0 \pmod{2389}$ is insoluble.

Solution by J. W. YOUNG, Oliver Graduate Scholar in Mathematics, Cornell University, Ithaca, N. Y., and H. S. VANDIVER, Bala, Pa.

We are to prove that -1457 is a quadratic non-residue of the odd prime 2389 . Using Legendre's symbol, we must show that

$$\left(\frac{-1457}{2389}\right) = -1.$$

$$\text{We have } \left(\frac{-1457}{2389}\right) = \left(\frac{-1}{2389}\right) \left(\frac{31}{2389}\right) \left(\frac{47}{2389}\right).$$

$$\left(\frac{-1}{2389}\right) = +1, \text{ since } 2389 \text{ is of the form } 4n+1.$$

By the law of reciprocity, we have $\left(\frac{31}{2389}\right) = \left(\frac{2389}{31}\right) = \left(\frac{2}{31}\right) = +1$, since in the first place 2389 is of the form $4n+1$, and since, secondly, 31 is of the form $8n \pm 1$.

$$\left(\frac{47}{2389}\right) = \left(\frac{2389}{47}\right) = \left(\frac{39}{47}\right) = -\left(\frac{47}{39}\right) = -\left(\frac{8}{39}\right) = -\left(\frac{2^2}{39}\right) \left(\frac{2}{39}\right) = -\left(\frac{2}{39}\right) = -1,$$

since 47 and 39 are both of the form $4n-1$, and 31 is of the form $2n \pm 1$.

$$\text{Therefore, finally, } \left(\frac{-1457}{2389}\right) = (+1)(+1)(-1) = -1.$$

Also solved by G. B. M. ZERR.

AVERAGE AND PROBABILITY.

103. Proposed by LON C. WALKER, A. M., Assistant Professor of Mathematics, Leland Stanford Jr. University, Palo Alto, Cal.

A circle is drawn at random both in magnitude and position, but so as to lie wholly on the surface of a given semi-circle. Show that the chance that a radius drawn at random in the semi-circle will cut the circle is

$$\frac{4}{3\pi - 4} \left(1 - \frac{1}{\pi} - \frac{2}{\pi} \log 2 \right).$$